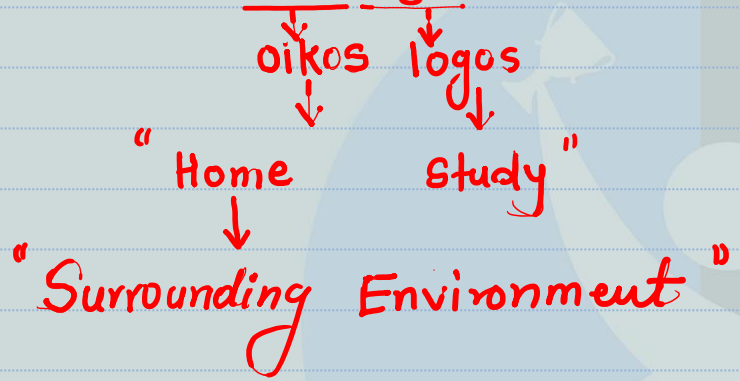
Introduction to Ecology

India's No **1** for NEET, IIT-JAM, GATE and NET Exams
www.ifasonline.com
9172266888

ECOLOGY

- Derived from term **Oikologie**



History of term Ecology:

- Isodore Geoffroy, St Hilaire (1859) : **Ethology**
- H Reiter (1868) : **Oikologie**
- Mivart (1894) : **Hexicology**
- Ernst Haeckel (1869) : **Ecology**

Definition's :

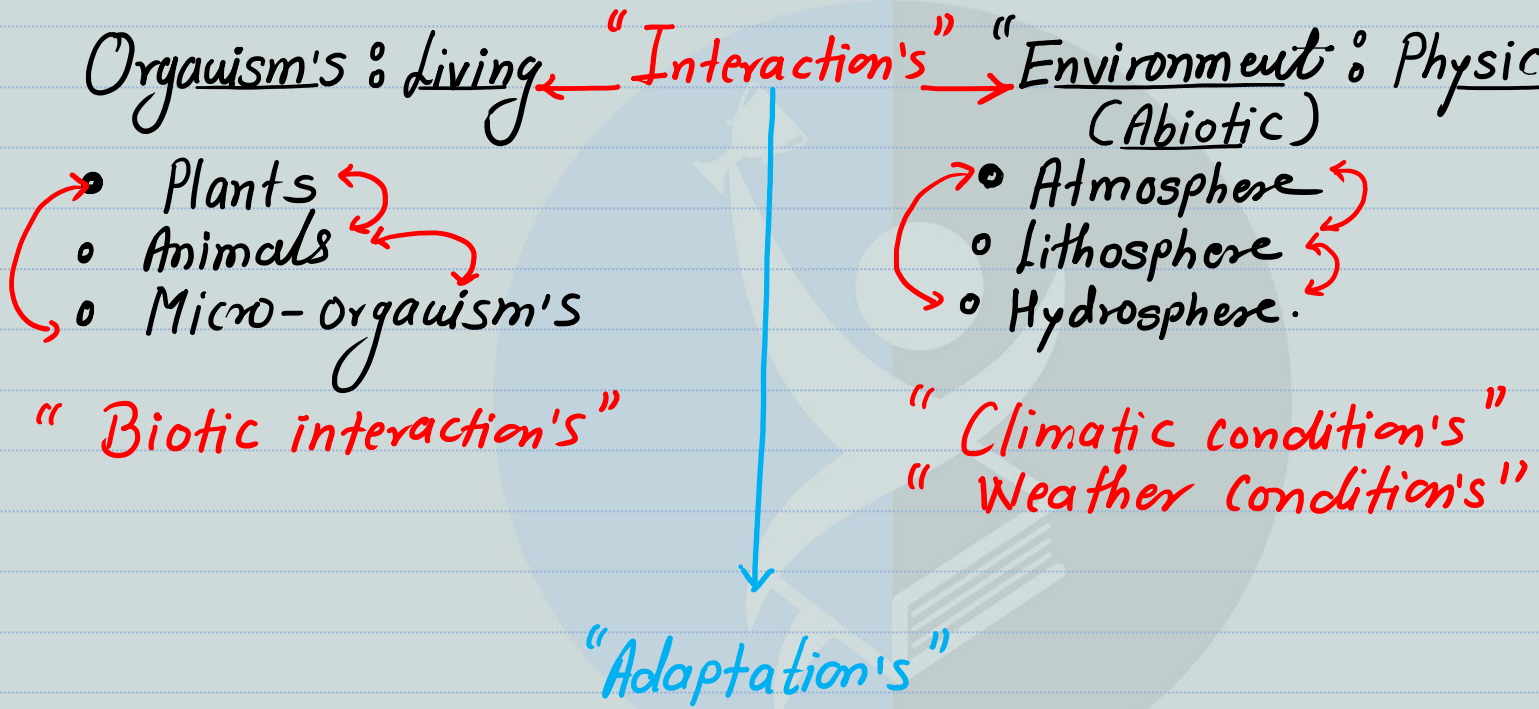
1. Haeckel (1869) : ' The science treating the reciprocal relationship of the organisms and the external world '.

2. Warming (1895, 1905) : ' The study of organisms in relation to their environment '.

3. Elton (1927) : ' The scientific natural history '.

4. R Misra (1967) : ' Interactions of form, functions and factors '.

5. Odum (1971) : ' Study of structure and function of nature '.


Orgauism's : Living
"Interaction's"
"Environment : Physical (Abiotic)"
Plants
Animals
Micro-orgauism's
"Biotic interaction's"
Atmosphere
Lithosphere
Hydrosphere.
"Climatic condition's"
"Weather condition's"
"Adaptation's"

How environment affect the organism in to it ?

↓

"Natural selection"

↓

"Adaptation"

1. Environment

The four major components of environment include;

- ✓ Lithosphere : Soil, Rock, Nutrients etc.
- ✓ Hydrosphere : H_2O.
- ✓ Atmosphere : Light, temp., Humidity, pressure, Gases etc.
- ✗ Biosphere : Living organisms.

1. Climate :

- Long term condition's.

(Avg. climatic condition)

Global climate : Worldwide

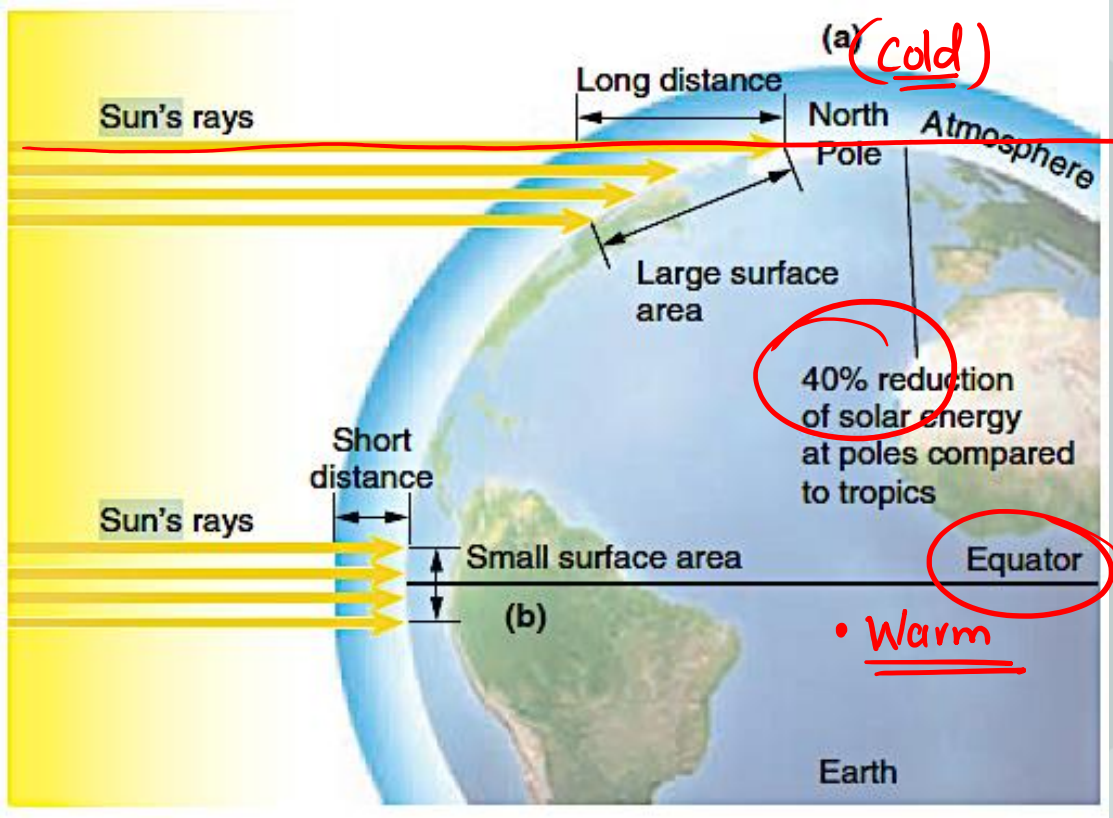
Local climate : Regional

Micro-climate : Small region.

2. Weather :

- Short term condition

- Light- ✓✓
- Air circulation cell- ✓✓
- Rain fall. ✓✓
- Etc.

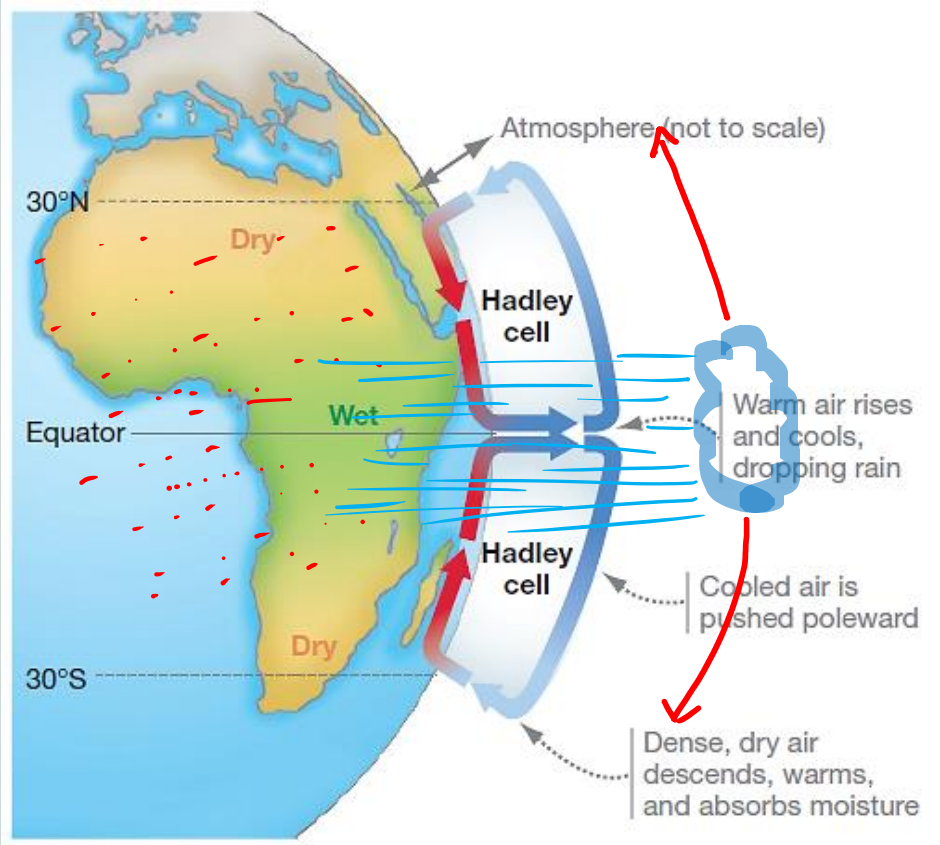


1. Distance (cold)
   - Pole ↑
   - Equator ↓

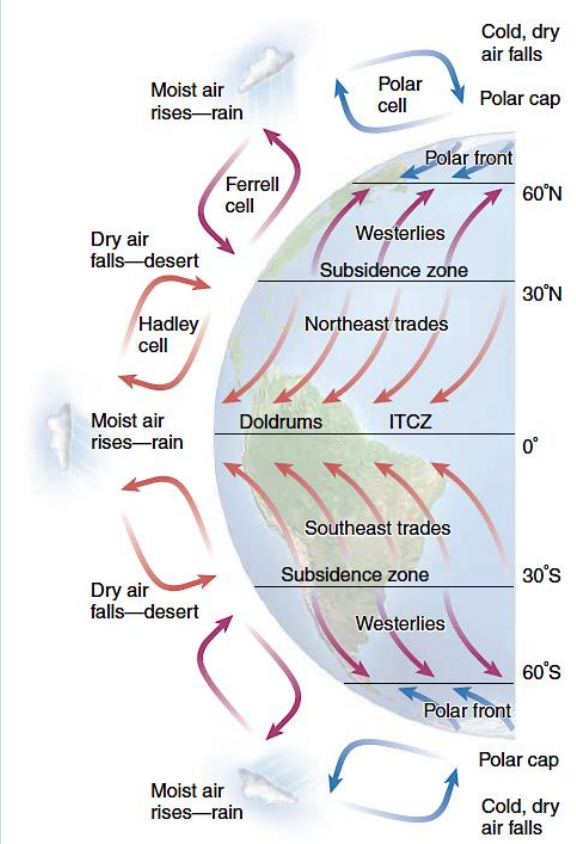
2. Angle
   - Poles : Low
   - equator – 90°

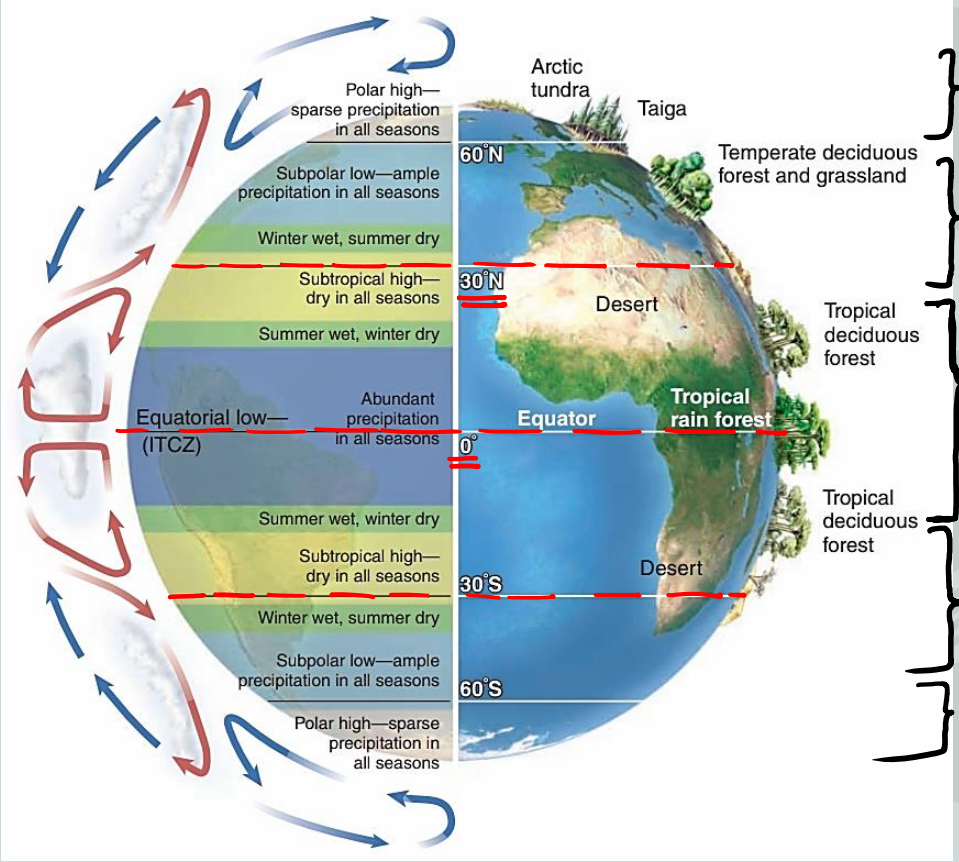
3. Surface area
   - Poles – Large surface
   - Equator – small surface.

- Warm



- Warm air
  - WHC ↑
- Cold air
  - WHC ↓


Cold, dry air falls
Polar cell
Polar cap
Moist air rises—rain
Polar front
Ferrell cell
60°N
Westerlies
Dry air falls—desert
Subsidence zone
30°N
Hadley cell
Northeast trades
Moist air rises—rain
Doldrums
ITCZ
0°
Southeast trades
Subsidence zone
30°S
Dry air falls—desert
Westerlies
60°S
Polar front
Polar cap
Moist air rises—rain
Cold, dry air falls



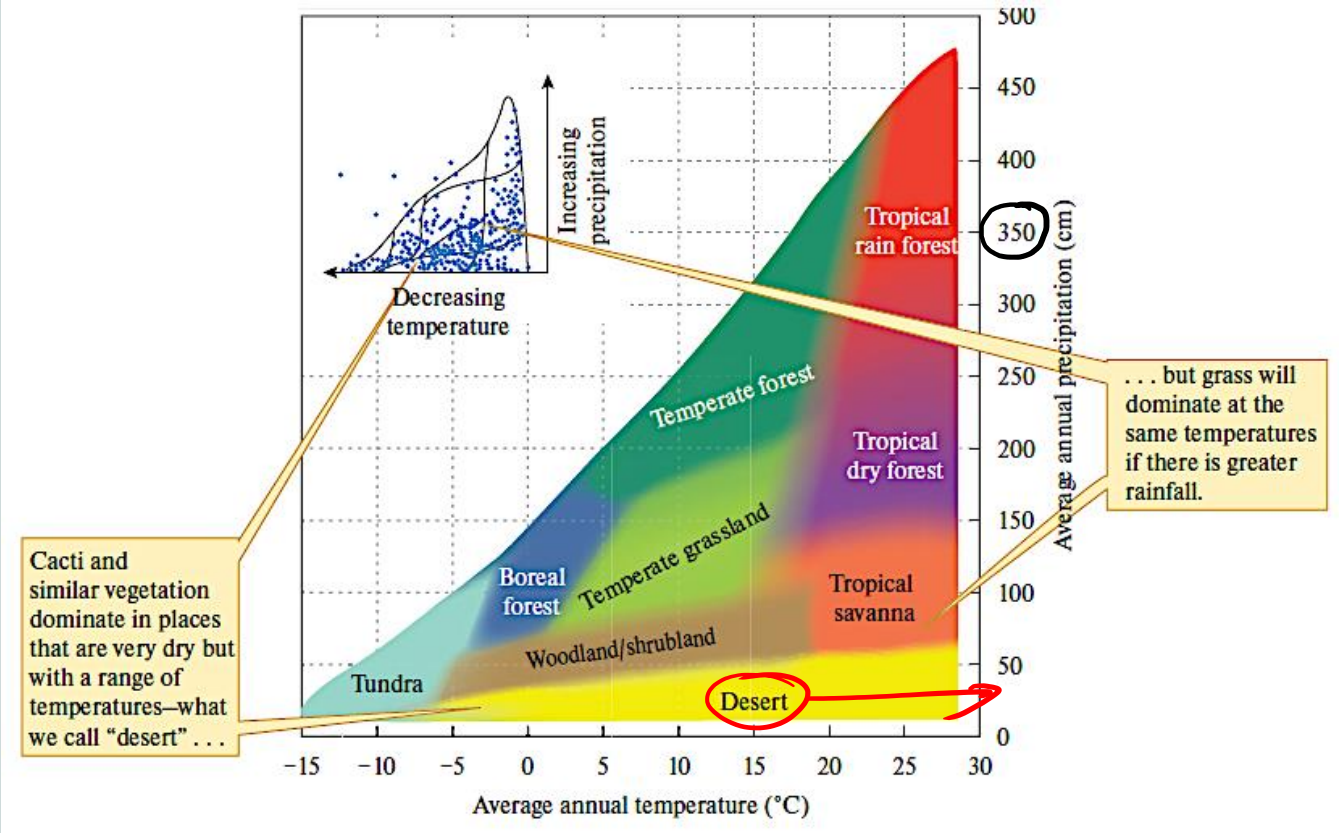
Polar zone
- Very cold.
- Snow fall.
- Biodiversity ↓

Temperate zone
- Temp. ↓
- Rainfall ↓
- Biodiversity ↓

Tropical zone
- Temp. ↑
- Rainfall ↑
- Biodiversity ↑

Temperate zone

Polar zone.

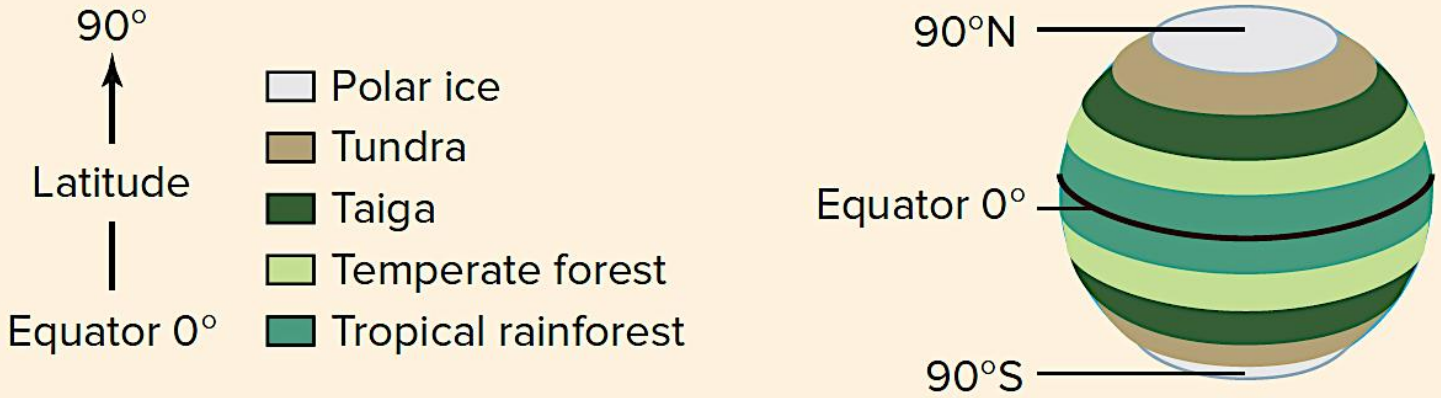


Tropical region
- Rainfall – 350cm.
- Temp. – 20–25 °C

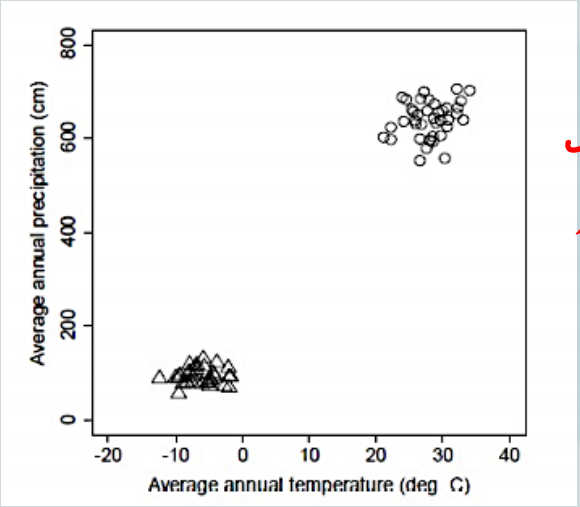
Temperate region
- Rainfall – 250cm
- Temp. – 15–20 °C

Polar region
- Snow fall
- Very cold.

Latitude


90°
Latitude
Equator 0°
Polar ice
Tundra
Taiga
Temperate forest
Tropical rainforest
90°N
Equator 0°
90°S

In the schematic below, the circles and triangles represent climatic zones occupied by two different biomes along gradients of precipitation and temperature. Which of the following is an accurate description of these biomes?



(A) Circles = Tropical Rainforest; Triangles = Temperate Rainforest
(B) Circles = Subtropical Desert; Triangles = Tropical grassland
(C) Circles = Tropical Rainforest, Triangles = Tundra
(D) Circles = Tundra; Triangles = Subtropical Desert

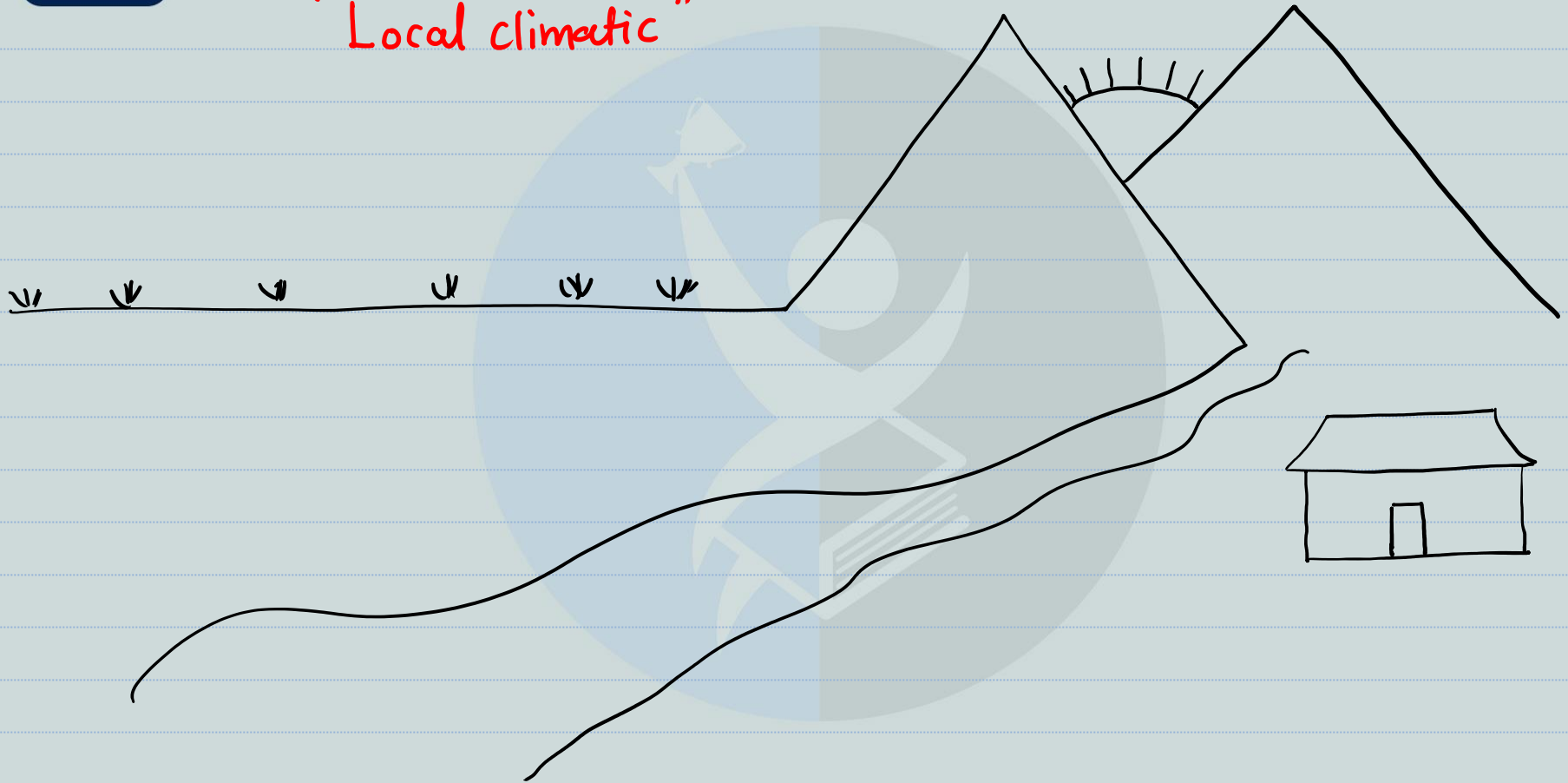
Local climate : Climate of an any given area.

↳ Topography / Topology – Lay of land.

↳ Water bodies.

Microclimate : Local variations of the climate within a given area.

"Local climatic"



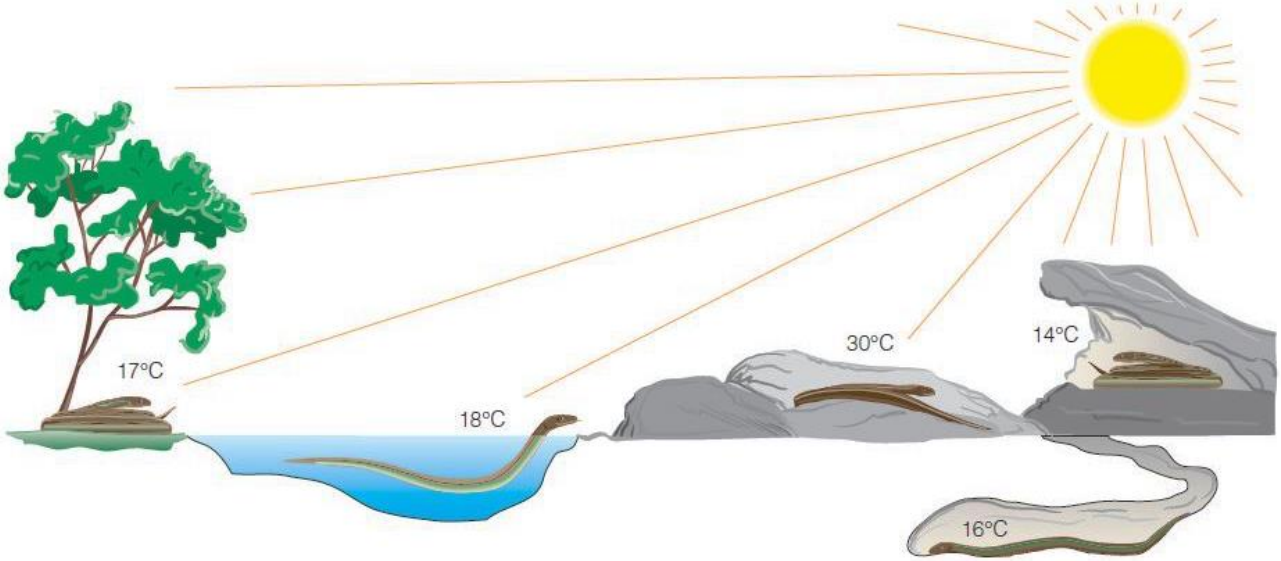


Figure 7.12 Microclimates a snake typically uses to regulate body temperature during the summer.

Factors affecting climatic & Weather conditions ;

1. Climatic factors
   - Light.
   - * Temperature.
   - * Rainfall.
   - Gases
   - fire

2. Topographic factors (Lay of land)
   - Latitude
   - Altitude
   - Direction of the mountain's
   - slop of the mountain's.

3. Edaphic factors (Soil)
   - pH
   - Nutrient content
   - Particle size.

Climatic Factors;

1. Light : Source of Energy (Electromagnetic radiation)

↳ Responsible for creation of climatic pattern.

Plants

- Photosynthesis.
- Photo-trophism
- Photo-morphogenesis.
- pigmentation

etc.

Animals

- Vision
- pigmentation
- Coral's pigmentation.

etc.

2 .Temperature : Measure of Heat in any System.

- **Effect on Plants**
  - Metabolism
  - Growth and development
  - Reproduction
  - Distribution of plants on globe
- **Effect on Animals**
  - Metabolism
  - Growth and development
  - Reproduction
  - Sex ratio
  - Distribution of plants on globe
    (Ectotherms and endotherms)

Endotherms / Homeotherms

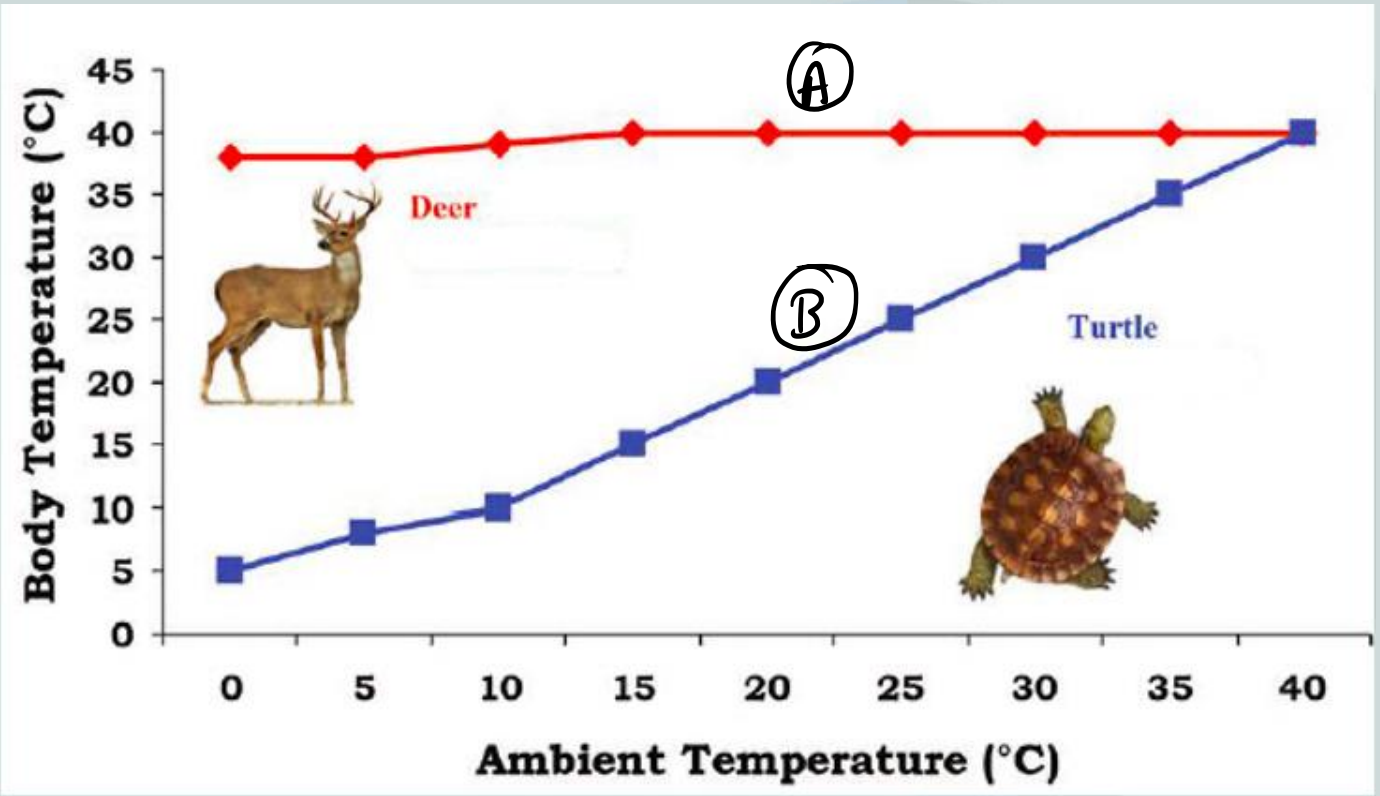
→ Regulate their internal body temp.

- Birds
- mammals.

Ectotherms / Heterotherms

→ Can not regulate their internal body temp.

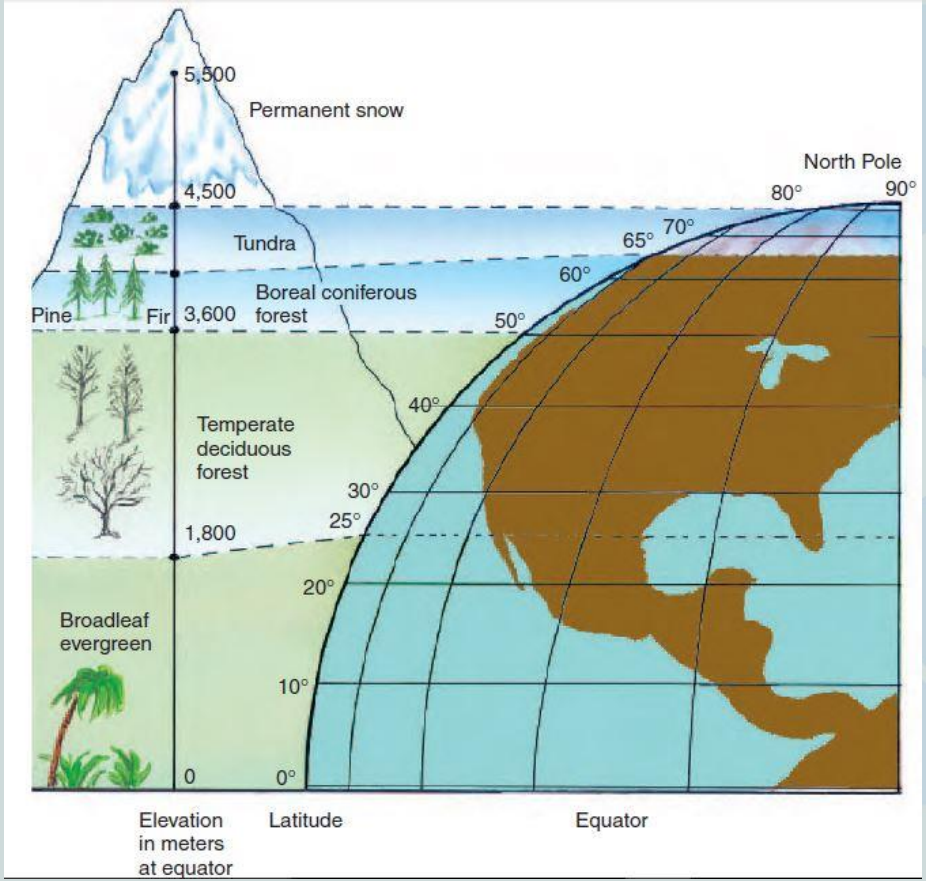
- Plants
- Invertebrates
- fish
- Amphibian's
- Reptiles
- Humming bird.*


A
B
Deer
Turtle
Body Temperature (°C)
0
5
10
15
20
25
30
35
40
45
Ambient Temperature (°C)

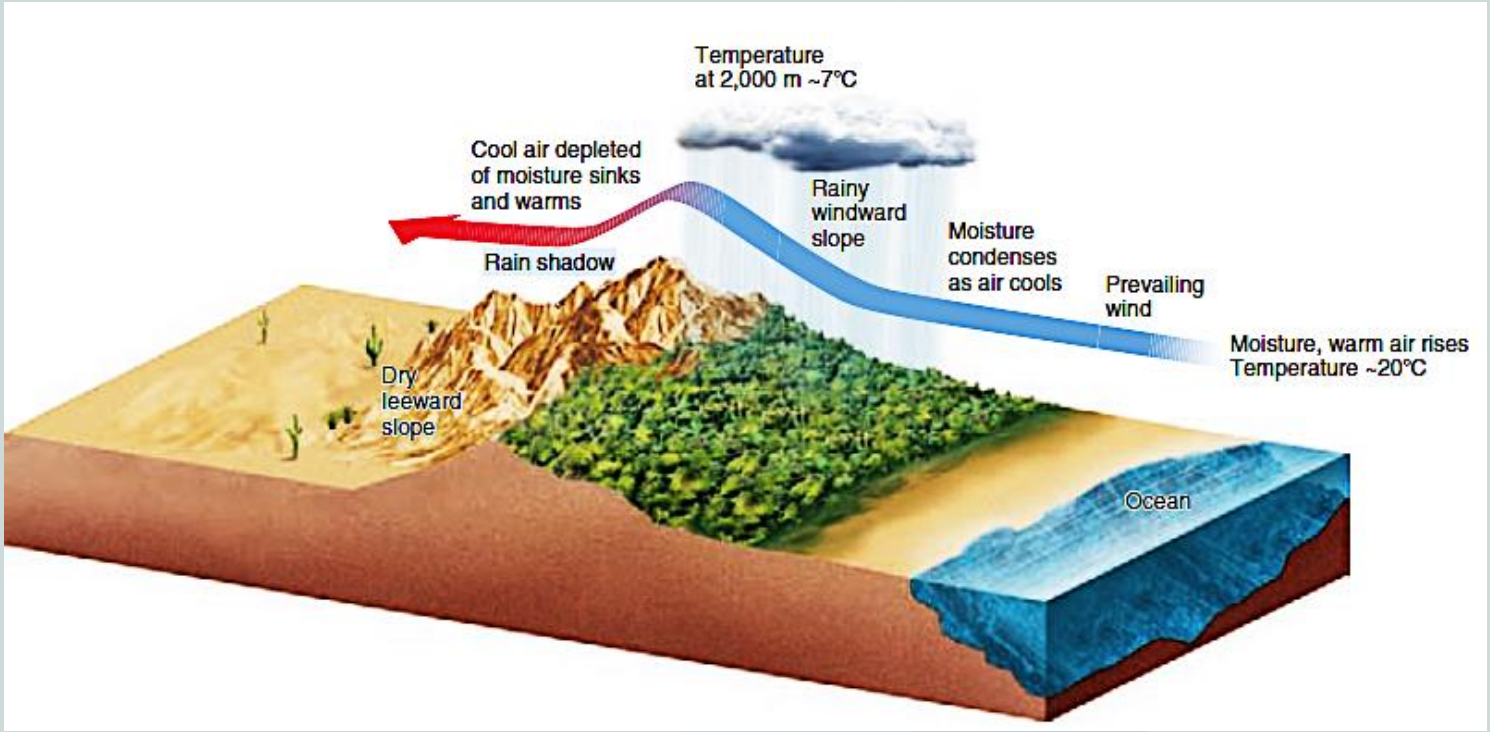
3. Rainfall / Water :

4. Fire : Is responsible for dominance of grasses in Grassland.

Topographic factors;


5,500
Permanent snow
4,500
Tundra
Pine
Fir
3,600
Boreal coniferous forest
Temperate deciduous forest
1,800
Broadleaf evergreen
0
Elevation in meters at equator
North Pole
90°
80°
70°
65°
60°
50°
40°
30°
25°
20°
10°
0°
Latitude
Equator

- Direction of the mountains; “ Rain-shadow effect ”


Temperature
at 2,000 m ~7°C
Cool air depleted
of moisture sinks
and warms
Rainy
windward
slope
Moisture
condenses
as air cools
Prevailing
wind
Rain shadow
Moisture, warm air rises
Temperature ~20°C
Dry
leeward
slope
Ocean

What is the rain-shadow effect in mountainous regions?

A) A phenomenon where rain clouds form on the eastern slopes of mountains

B) The enhanced precipitation on the windward slopes and lower precipitation on the leeward slopes

C) The warming of air as it moves down the eastern slopes of mountains

D) The pooling of cold air in low-lying areas during clear, calm nights

- **Slope of the mountains;**

Edaphic Factors;

Living organisms

Soil in naturally growing vegetation is-

(1) Acidic due to decomposition of organic matter

(2) Basic due to Bicarbonate in soil

(3) Neutral due to silicate buffer

(4) Acidic due to Sulphuric acid

HAPPY LEARNING

THANKS

India's No **1** for NEET, IIT-JAM, GATE and NET Exams
www.ifasonline.com
9172266888